

# SEQUENCE LISTING

<110> Sligar, Steven  
Bayburt, Timothy

<120> Membrane Scaffold Proteins

<130> 87-00

<140> Not assigned

<141> 2001-11-20

<150> US 60/252,233

<151> 2000-11-20

<160> 46

<170> PatentIn Ver. 2.0

<210> 1

<211> 762

<212> DNA

<213> Homo sapiens

<220>

<221> misc\_feature

<222> (1)..(762)

<223> Restriction sites, Nco I and Hind III, are at 5'  
and 3' termini.

<400> 1

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acctggccac tgtgtacgtg gatgtgctca aagacagcgg cagagactat gtgtcccagt 120
ttgaaggctc cgccttggga aaacagctaa acctaaagct ccttgacaac tgggacagcg 180
tgacctccac cttcagcaag ctgcgcgaac agctcggccc tgtgaccag gagttctggg 240
ataacctgga aaaggagaca gagggcctga ggcaagagat gagcaaggat ctggaggagg 300
tgaaggccaa ggtgcagccc tacctggacg acttcagaa gaagtggcag gaggagatgg 360
agctctaccg ccagaagggtg gagccgctgc gcgcagagct ccaagagggc gcgcgccaga 420
agctgcacga gctgcaagag aagctgagcc cactgggcga ggagatgcgc gaccgcgcgc 480
gcgcccattg ggacgcgctg cgcacgcata tggcccccta cagcgacgag ctgcgccagc 540
gcttgggcgc gcgccttgag gctctcaagg agaacggcgg cgccagactg gccgagtacc 600
acgccaaggc caccgagcat ctgagcacgc tcagcgagaa ggccaagccc gcgctcgagg 660
acctccgcca aggcctgctg cccgtgctgg agagcttcaa ggtcagcttc ctgagcgctc 720
tcgaggagta cactaagaag ctcaacaccc agtaataagc tt 762
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<210> 2

<211> 250

<212> PRT

<213> Homo sapiens

<400> 2

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Met Ala His Phe Trp Gln Gln Asp Glu Pro Pro Gln Ser Pro Trp Asp
1 5 10 15
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Arg Val Lys Asp Leu Ala Thr Val Tyr Val Asp Val Leu Lys Asp Ser  
           20                          25                          30  
 Gly Arg Asp Tyr Val Ser Gln Phe Glu Gly Ser Ala Leu Gly Lys Gln  
           35                          40                          45  
 Leu Asn Leu Lys Leu Leu Asp Asn Trp Asp Ser Val Thr Ser Thr Phe  
           50                          55                          60  
 Ser Lys Leu Arg Glu Gln Leu Gly Pro Val Thr Gln Glu Phe Trp Asp  
           65                          70                          75                          80  
 Asn Leu Glu Lys Glu Thr Glu Gly Leu Arg Gln Glu Met Ser Lys Asp  
                           85                          90                          95  
 Leu Glu Glu Val Lys Ala Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln  
                           100                          105                          110  
 Lys Lys Trp Gln Glu Glu Met Glu Leu Tyr Arg Gln Lys Val Glu Pro  
           115                          120                          125  
 Leu Arg Ala Glu Leu Gln Glu Gly Ala Arg Gln Lys Leu His Glu Leu  
           130                          135                          140  
 Gln Glu Lys Leu Ser Pro Leu Gly Glu Glu Met Arg Asp Arg Ala Arg  
           145                          150                          155                          160  
 Ala His Val Asp Ala Leu Arg Thr His Leu Ala Pro Tyr Ser Asp Glu  
                           165                          170                          175  
 Leu Arg Gln Arg Leu Ala Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly  
           180                          185                          190  
 Gly Ala Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser  
           195                          200                          205  
 Thr Leu Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly  
           210                          215                          220  
 Leu Leu Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu  
           225                          230                          235                          240  
 Glu Glu Tyr Thr Lys Lys Leu Asn Thr Gln  
                           245                          250

<210> 3

<211> 61

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 3  
tataccatgg gccatcatca tcatcatcat atagaaggaa gactaaagct ccttgacaac 60  
t 61

<210> 4  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 4  
gcaagcttat tactgggtgt tgagcttctt 30

<210> 5  
<211> 654  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Nucleotide  
sequence encoding Synthetic peptide.

<400> 5  
tataccatgg gccatcatca tcatcatcat atagaaggaa gactaaagct ccttgacaac 60  
tgggacagcg tgacctccac cttcagcaag ctgcgcgaac agctcggccc tgtgacctcag 120  
gagttctggg ataacctgga aaaggagaca gagggcctga ggcaggagat gagcaaggat 180  
ctggaggagg tgaaggccaa ggtgcagccc tacctggacg acttccagaa gaagtggcag 240  
gaggagatgg agctctaccg ccagaagggtg gagccgctgc gcgcagagct ccaagagggc 300  
gaccgcgcgc agctgcacga gctgcaagag aagttgagcc cactgggcga ggagatgcgc 360  
gaccgcgcgc gcgcccatgt ggacgcgctg cgcacgcctc tggcccccta cagcgacgag 420  
ctgcgccagc gcttgccgcg gcgccttgag gctctcaagg agaacggcgg cgccagactg 480  
gccgagtacc acgccaaagg caccgagcat ctgagcacgc tcagcgagaa ggccaaaccc 540  
gcgctcgagg acctccgcca aggctgctg cccgtgctgg agagcttcaa ggtcagcttc 600  
ctgagcgctc tcgaggagta cactaagaag ctcaacaccc agtaataagc ttgc 654

<210> 6  
<211> 212  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
peptide

<400> 6  
Met Gly His His His His His Ile Glu Gly Arg Leu Lys Leu Leu  
1 5 10 15  
Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln  
20 25 30

Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr  
           35                          40                          45  
 Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu Glu Glu Val Lys Ala  
           50                          55                          60  
 Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu  
           65                          70                          75                          80  
 Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu Arg Ala Glu Leu Gln  
                           85                          90                          95  
 Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln Glu Lys Leu Ser Pro  
                           100                          105                          110  
 Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala His Val Asp Ala Leu  
           115                          120                          125  
 Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu Arg Gln Arg Leu Ala  
           130                          135                          140  
 Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly Ala Arg Leu Ala Glu  
           145                          150                          155                          160  
 Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr Leu Ser Glu Lys Ala  
                           165                          170                          175  
 Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu Leu Pro Val Leu Glu  
                           180                          185                          190  
 Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu Glu Tyr Thr Lys Lys  
           195                          200                          205  
 Leu Asn Thr Gln  
           210

<210> 7  
 <211> 27  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:  
           Oligonucleotide primer

<400> 7  
 taccatggca aagctccttg acaactg

27

<210> 8  
 <211> 619  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>

<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 8

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taccatggca aagctccttg acaactggga cagcgtgacc tccaccttca gcaagctgcg 60
cgaacagctc ggccctgtga cccaggagtt ctgggataac ctggaaaagg agacagaggg 120
cctgaggcag gagatgagca aggatctgga ggaggtgaag gccaaaggtgc agccctacct 180
ggacgacttc cagaagaagt ggcaggagga gatggagctc taccgccaga aggtggagcc 240
gctgcgcgca gagctccaag agggcgcgcg ccagaagctg cagcagctgc aagagaagtt 300
gagcccactg ggcgaggaga tgcgcgaccg cgcgcgcgcc catgtggacg cgctgcgcac 360
gcatctggcc ccctacagcg acgagctgcg ccagcgcttg gccgcgcgcc ttgaggctct 420
caaggagaac ggcggcgcca gactggccga gtaccacgcc aaggccaccg agcatctgag 480
cacgctcagc gagaaggcca aaccgcgcgt cgaggacctc cgccaaggcc tgctgcccgt 540
gctggagagc ttcaaggtca gcttcctgag cgctctcgag gactacacta agaagctcaa 600
caccagtaa taagcttgc                                     619
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<210> 9

<211> 201

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
peptide

<400> 9

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Met Ala Lys Leu Leu Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser
  1              5              10              15

Lys Leu Arg Glu Gln Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn
      20              25              30

Leu Glu Lys Glu Thr Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu
      35              40              45

Glu Glu Val Lys Ala Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys
      50              55              60

Lys Trp Gln Glu Glu Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu
      65              70              75              80

Arg Ala Glu Leu Gln Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln
      85              90              95

Glu Lys Leu Ser Pro Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala
      100              105              110

His Val Asp Ala Leu Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu
      115              120              125

Arg Gln Arg Leu Ala Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly
      130              135              140

Ala Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr
      145              150              155              160
```

Leu Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu  
 165 170 175

Leu Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu  
 180 185 190

Glu Tyr Thr Lys Lys Leu Asn Thr Gln  
 195 200

<210> 10  
 <211> 27  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:  
 Oligonucleotide primer

<400> 10  
 taccatggca aagctccttg acaactg 27

<210> 11  
 <211> 61  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:  
 Oligonucleotide primer

<400> 11  
 tataccatgg gccatcatca tcatcatcat atagaaggaa gactaaagct ccttgacaac 60  
 t 61

<210> 12  
 <211> 52  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:  
 Oligonucleotide primer

<400> 12  
 taagaagctc aacacccagg gtaccggtgg aggtagtgga ggtggtaccc ta 52

<210> 13  
 <211> 50  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:  
 Oligonucleotide primer

<400> 13  
cagggtaccg gtggaggtag tggaggtggt accctaaagc tccttgacaa 50

<210> 14  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 14  
gcaagcttat tactgggtgt tgagcttctt 30

<210> 15  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
peptide

<400> 15  
Gly Thr Gly Gly Gly Ser Gly Gly Gly Thr  
1 5 10

<210> 16  
<211> 1260  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Nucleotide  
sequence encoding a synthetic peptide.

<400> 16  
tataccatgg gccatcatca tcatcatcat atagaaggaa gactaaagct ccttgacaac 60  
tgggacagcg tgacctccac cttcagcaag ctgcgcgaa agctcggccc tgtgacctag 120  
gagttctggg ataacctgga aaaggagaca gagggcctga ggcaggagat gagcaaggat 180  
ctggaggagg tgaaggccaa ggtgcagccc tacctggacg acttccagaa gaagtggcag 240  
gaggagatgg agctctaccg ccagaagggtg gagcgcgtgc gcgcagagct ccaagagggc 300  
gcgcgccaga agctgcacga gctgcaagag aagctgagcc cactgggcga ggagatgcgc 360  
gaccgcgcgc gcgcacctgt ggacgcgctg cgcacgcac tggcccccta cagcgacgag 420  
ctgcgccagc gcttggccgc gcgccttgag gctctcaagg agaacggcgg cgccagactg 480  
gcccagtagc accccaaggc caccgagcat ctgagcacgc tcagcgagaa ggccaagccc 540  
gcgctcgagc acctccgcca aggcctgctg cccgtgctgg agagcttcaa ggtcagcttc 600  
ctgagcgctc tcgaggagta cactaagaag ctcaacaccc agggtagcct aaagctcctt 660  
gacaactggg acagcgtgac ctccaccttc agcaagctgc gcgaacagct cggccctgtg 720  
acctcaggag tctgggataa cctggaaaag gagacagagg gcctgaggca ggagatgagc 780  
aaggatctgg aggaggtgaa ggccaagggtg cagccctacc tggacgactt ccagaagaag 840  
tggcaggagg agatggagct ctaccgccag aaggtggagc cgctgcgcgc agagctccaa 900  
gagggcgcgc gccagaagct gcacgagctg caagagaagc tgagccactt gggcgaggag 960





Leu Asn Thr Gln Gly Thr Leu Lys Leu Leu Asp Asn Trp Asp Ser Val  
 210 215 220  
 Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln Leu Gly Pro Val Thr Gln  
 225 230 235 240  
 Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr Glu Gly Leu Arg Gln Glu  
 245 250 255  
 Met Ser Lys Asp Leu Glu Glu Val Lys Ala Lys Val Gln Pro Tyr Leu  
 260 265 270  
 Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu Met Glu Leu Tyr Arg Gln  
 275 280 285  
 Lys Val Glu Pro Leu Arg Ala Glu Leu Gln Glu Gly Ala Arg Gln Lys  
 290 295 300  
 Leu His Glu Leu Gln Glu Lys Leu Ser Pro Leu Gly Glu Glu Met Arg  
 305 310 315 320  
 Asp Arg Ala Arg Ala His Val Asp Ala Leu Arg Thr His Leu Ala Pro  
 325 330 335  
 Tyr Ser Asp Glu Leu Arg Gln Arg Leu Ala Ala Arg Leu Glu Ala Leu  
 340 345 350  
 Lys Glu Asn Gly Gly Ala Arg Leu Ala Glu Tyr His Ala Lys Ala Thr  
 355 360 365  
 Glu His Leu Ser Thr Leu Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp  
 370 375 380  
 Leu Arg Gln Gly Leu Leu Pro Val Leu Glu Ser Phe Lys Val Ser Phe  
 385 390 395 400  
 Leu Ser Ala Leu Glu Glu Tyr Thr Lys Lys Leu Asn Thr Gln  
 405 410

<210> 18  
 <211> 1282  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Synthetic  
 nucleotide sequence encoding an artificial  
 protein.

<400> 18  
 taccatgggc catcatcatc atcatcatat agaaggaaga ctaaagctcc ttgacaactg 60  
 ggacagcgtg acctccacct tcagcaagct ggcgaacag ctgggccttg tgaccagga 120  
 gttctgggat aacctggaaa aggagacaga ggcctgagg caggagatga gcaaggatct 180  
 ggaggaggtg aaggccaagg tgcagcccta cctggacgac ttccagaaga agtggcagga 240

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ggagatggag ctctaccgcc agaaggtgga gccgctgcgc gcagagctcc aagagggcgc 300
gcgccagaag ctgcacgagc tgcaagagaa gctgagccca ctgggcgagg agatgcgcga 360
ccgcgcgcgc gcccatgttg acgcgctgcg cacgcatctg gccccctaca gcgacgagct 420
gcgccagcgc ttggccgcgc gccttgaggc tctcaaggag aacggcggcg ccagactggc 480
cgagtaccac gccaaggcca ccgagcatct gagcacgctc agcgagaagg ccaagcccgc 540
gctcgaggac ctccgccaag gcctgctgcc cgtgctggag agcttcaagg tcagcttcct 600
gagcgccttc gaggagtaca ctaagaagct caacacccag ggtaccggtg gaggtagtgg 660
aggtggtacc ctaaagctcc ttgacaactg ggacagcgtg acctccacct tcagcaagct 720
gcgcgaacag ctcggccctg tgacccagga gttctgggat aacctggaaa aggagacaga 780
gggcctgagg caggagatga gcaaggatct ggaggagggt aaggccaagg tgcagcccta 840
cctggacgac ttccagaaga agtggcagga ggagatggag ctctaccgcc agaaggtgga 900
gccgctgcgc gcagagctcc aagagggcgc gcgccagaag ctgcacgagc tgcaagagaa 960
gctgagccca ctgggcgagg agatgcgcga ccgcgcgcgc gcccatgttg acgcgctgcg 1020
cacgcatctg gccccctaca gcgacgagct gcgccagcgc ttggccgcgc gccttgaggc 1080
tctcaaggag aacggcggcg ccagactggc cgagtaccac gccaaggcca ccgagcatct 1140
gagcacgctc agcgagaagg ccaagcccgc gctcgaggac ctccgccaag gcctgctgcc 1200
cgtgctggag agcttcaagg tcagcttcct gagcgccttc gaggagtaca ctaagaagct 1260
caacaccag taataagctt gc 1282

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<210> 19

<211> 422

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 19

Met Gly His His His His His Ile Glu Gly Arg Leu Lys Leu Leu  
1 5 10 15

Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln  
20 25 30

Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr  
35 40 45

Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu Glu Glu Val Lys Ala  
50 55 60

Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu  
65 70 75 80

Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu Arg Ala Glu Leu Gln  
85 90 95

Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln Glu Lys Leu Ser Pro  
100 105 110

Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala His Val Asp Ala Leu  
115 120 125

Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu Arg Gln Arg Leu Ala  
130 135 140

Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly Ala Arg Leu Ala Glu  
 145 150 155 160  
 Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr Leu Ser Glu Lys Ala  
 165 170 175  
 Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu Leu Pro Val Leu Glu  
 180 185 190  
 Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu Glu Tyr Thr Lys Lys  
 195 200 205  
 Leu Asn Thr Gln Gly Thr Gly Gly Gly Ser Gly Gly Gly Thr Leu Lys  
 210 215 220  
 Leu Leu Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg  
 225 230 235 240  
 Glu Gln Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys  
 245 250 255  
 Glu Thr Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu Glu Glu Val  
 260 265 270  
 Lys Ala Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys Lys Trp Gln  
 275 280 285  
 Glu Glu Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu Arg Ala Glu  
 290 295 300  
 Leu Gln Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln Glu Lys Leu  
 305 310 315 320  
 Ser Pro Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala His Val Asp  
 325 330 335  
 Ala Leu Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu Arg Gln Arg  
 340 345 350  
 Leu Ala Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly Ala Arg Leu  
 355 360 365  
 Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr Leu Ser Glu  
 370 375 380  
 Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu Leu Pro Val  
 385 390 395 400  
 Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu Glu Tyr Thr  
 405 410 415  
 Lys Lys Leu Asn Thr Gln  
 420

<210> 20  
<211> 43  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 20  
tggagctcta cgcgagaag gtggagccct acagcgacga gct 43

<210> 21  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 21  
gcaagcttat tactgggtgt tgagcttctt 30

<210> 22  
<211> 522  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
nucleotide sequence encoding an artificial  
peptide.

<400> 22  
tataccatgg gccatcatca tcatcatcat atagaaggaa gactaaagct ccttgacaac 60  
tgggacagcg tgacctccac cttcagcaag ctgcgcgaac agctcggccc tgtgacccag 120  
gagttctggg ataacctgga aaaggagaca gagggcctga ggcaggagat gagcaaggat 180  
ctggaggagg tgaaggccaa ggtgcagccc tacctggacg acttccagaa gaagtggcag 240  
gaggagatgg agctctaccg ccagaagggtg gagccctaca gcgacgagct gcgccagcgc 300  
ttggccgcgc gccttgaggc tctcaaggag aacggcggcg ccagactggc cgagtaccac 360  
gccaaggcca ccgagcatct gagcacgctc agcgagaagg ccaaaccgcg gctcgaggac 420  
ctccgccaaag gcctgctgcc cgtgctggag agcttcaagg tcagcttcct gagecgtctc 480  
gaggagtaca ctaagaagct caacaccag taataagctt gc 522

<210> 23  
<211> 168  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
peptide

<400> 23

Met Gly His His His His His Ile Glu Gly Arg Leu Lys Leu Leu  
1 5 10 15

Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln  
20 25 30

Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr  
35 40 45

Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu Glu Glu Val Lys Ala  
50 55 60

Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu  
65 70 75 80

Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Tyr Ser Asp Glu Leu Arg  
85 90 95

Gln Arg Leu Ala Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly Ala  
100 105 110

Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr Leu  
115 120 125

Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu Leu  
130 135 140

Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu Glu  
145 150 155 160

Tyr Thr Lys Lys Leu Asn Thr Gln  
165

<210> 24  
<211> 29  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 24  
cagaattcgc tagccgagta ccacgcaa

29

<210> 25  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 25  
gcaagcttat tactgggtgt tgagcttctt 30

<210> 26  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 26  
ataccatggg ccatcatcat catcatcata 30

<210> 27  
<211> 33  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 27  
cagaattcgc tagcctggcg ctcaacttct ctt 33

<210> 28  
<211> 522  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
nucleotide sequence encoding an artificial  
peptide.

<400> 28  
tataccatgg gccatcatca tcatcatcat atagaaggaa gactaaagct ccttgacaac 60  
tgggacagcg tgacctccac cttcagcaag ctgcgcgaa agctcggccc tgtgacccag 120  
gagttctggg ataacctgga aaaggagaca gagggcctga ggcaggagat gagcaaggat 180  
ctggaggagg tgaaggccaa ggtgcagccc tacctggacg acttcagaa gaagtggcag 240  
gaggagatgg agctctaccg ccagaagggtg gagccgctgc gcgcagagct ccaagagggc 300  
gcgcgccaga agctgcacga gctgcaagag aagttgagcg ccaggctagc cgagtaccac 360  
gccaaggcca ccgagcatct gagcacgctc agcgagaagg ccaaaccgc gctcgaggac 420  
ctccgccaag gctgctgccc cgtgctggag agcttcaagg tcagcttcct gagcgtctc 480  
gaggagtaca ctaagaagct caacaccag taataagctt gc 522

<210> 29  
<211> 168  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic

peptide

<400> 29

Met Gly His His His His His His Ile Glu Gly Arg Leu Lys Leu Leu  
1 5 10 15

Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln  
20 25 30

Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr  
35 40 45

Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu Glu Glu Val Lys Ala  
50 55 60

Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu  
65 70 75 80

Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu Arg Ala Glu Leu Gln  
85 90 95

Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln Glu Lys Leu Ser Ala  
100 105 110

Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr Leu  
115 120 125

Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu Leu  
130 135 140

Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu Glu  
145 150 155 160

Tyr Thr Lys Lys Leu Asn Thr Gln  
165

<210> 30

<211> 77

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
nucleotide

<400> 30

taccatgggt catcatcatc atcatcacat tgagggacgt ctgaagctgt tggacaattg 60  
ggactctgtt acgtcta 77

<210> 31

<211> 62

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
nucleotide

<400> 31

aggaattctg ggacaacctg gaaaaagaaa ccgagggact gcgtcaggaa atgtccaaag 60  
at 62

<210> 32

<211> 54

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
nucleotide

<400> 32

tatctagatg actttcagaa aaaatggcag gaagagatgg aattatatcg tcaa 54

<210> 33

<211> 73

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
nucleotide

<400> 33

atgagctcca agagaagctc agcccattag gcgaagaaat gcgcgatcgc gcccggtgcac 60  
atgttgatgc act 73

<210> 34

<211> 65

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
nucleotide

<400> 34

gtctcgaggc gctgaaagaa aacgggggtg cccgcttggc tgagtaccac gcgaaagcga 60  
cagaa 65

<210> 35

<211> 56

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
nucleotide



<400> 35  
gaagatctac gccagggctt attgcctgtt cttgagagct ttaaagtcag ttttct 56

<210> 36  
<211> 61  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
nucleotide

<400> 36  
cagaattcct gcgtcacggg gccagttgt tcgcgaagtt tactgaaggt agacgtaaca 60  
g 61

<210> 37  
<211> 55  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
nucleotide

<400> 37  
tcattctagat atggctgaac cttggccttc acctcttcta aatctttgga cattt 55

<210> 38  
<211> 80  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
nucleotide

<400> 38  
tggagctcat ggagtttttg gcgtgcccc tcttgagtt ccgcacgcag cggttccacc 60  
ttttgacgat ataattccat 80

<210> 39  
<211> 76  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic  
nucleotide

<400> 39  
gcctcgagac gtgcggccaa acgctggcga agttcatccg aatacggcgc caaatgagtc 60  
cggagtgcac caacat 76

<210> 40

<211> 61  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
nucleotide

<400> 40

gtagatcttc cagcgccggt ttcgcttttt cgctcaaggt gctcaggtgt tctgtcgctt 60  
t 61

<210> 41

<211> 66

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
nucleotide

<400> 41

ccaagcttat tactgggtat tcagcttttt agtatattct tccagagctg acagaaaact 60  
gacttt 66

<210> 42

<211> 651

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
nucleotide

<400> 42

accatgggtc atcatcatca tcatcacatt gagggacgtc tgaagctgtt ggacaattgg 60  
gactctgtta cgtctacctt cagtaaaactt cgcgaacaac tgggccccgt gacgcaggaa 120  
ttctgggaca acctggaaaa agaaaccgag ggactgcgtc aggaaatgtc caaagattta 180  
gaagaggtga aggccaaggt tcagccatat ctagatgact ttcagaaaaa atggcaggaa 240  
gagatggaat tatatcgtca aaaggtggaa ccgtgcgtg cggaactgca agagggggca 300  
cgccaaaaac tccatgagct ccaagagaag ctcagcccat taggcgaaga aatgcgcgat 360  
cgcgccccgtg cacatgttga tgcactccgg actcatttgg cgccgtattc ggatgaactt 420  
cgccagcgtt tggccgcacg tctcgaggcg ctgaaagaaa acgggggtgc ccgcttggct 480  
gagtaccacg cgaaagcgac agaacacctg agcaccttga gcgaaaaagc gaaaccggcg 540  
ctggaagatc tacgccaggg cttattgcct gttcttgaga gctttaaagt cagttttctg 600  
tcagctctgg aagaatatac taaaaagctg aataccagct aataagcttg g 651

<210> 43

<211> 201

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
peptide

<400> 43

Met Gly His His His His His Ile Glu Gly Arg Leu Lys Leu Leu  
1 5 10 15

Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln  
20 25 30

Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr  
35 40 45

Glu Gly Leu Arg Gln Glu Met Ser Pro Tyr Leu Asp Asp Phe Gln Lys  
50 55 60

Lys Trp Gln Glu Glu Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu  
65 70 75 80

Arg Ala Glu Leu Gln Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln  
85 90 95

Glu Lys Leu Ser Pro Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala  
100 105 110

His Val Asp Ala Leu Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu  
115 120 125

Arg Gln Arg Leu Ala Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly  
130 135 140

Ala Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr  
145 150 155 160

Leu Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu  
165 170 175

Leu Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu  
180 185 190

Glu Tyr Thr Lys Lys Leu Asn Thr Gln  
195 200

<210> 44

<211> 201

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic  
peptide

<400> 44

Met Gly His His His His His Ile Glu Gly Arg Leu Lys Leu Leu  
1 5 10 15

Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln  
20 25 30

Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr  
                   35                                  40                                  45  
 Glu Gly Leu Arg Gln Glu Met Ser Lys Asp Leu Glu Glu Val Lys Ala  
                   50                                  55                                  60  
 Lys Val Gln Pro Tyr Leu Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu  
                   65                                  70                                  75                                  80  
 Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu Arg Ala Glu Leu Gln  
                                   85                                  90                                  95  
 Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln Glu Lys Leu Ser Pro  
                                   100                                  105                                  110  
 Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala His Val Asp Ala Leu  
                                   115                                  120                                  125  
 Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu Arg Gln Arg Leu Ala  
                                   130                                  135                                  140  
 Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly Ala Arg Leu Ala Glu  
                                   145                                  150                                  155                                  160  
 Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr Leu Ser Glu Lys Ala  
                                   165                                  170                                  175  
 Lys Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu  
                                   180                                  185                                  190  
 Glu Tyr Thr Lys Lys Leu Asn Thr Gln  
                                   195                                  200

<210> 45

<211> 392

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 45

Met Gly His His His His His His Ile Glu Gly Arg Leu Lys Leu Leu  
           1                                  5                                  10                                  15  
 Asp Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln  
                                   20                                  25                                  30  
 Leu Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr  
                                   35                                  40                                  45  
 Glu Gly Leu Arg Gln Glu Met Ser Pro Tyr Leu Asp Asp Phe Gln Lys  
                                   50                                  55                                  60

Lys Trp Gln Glu Glu Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu  
 65 70 75 80  
 Arg Ala Glu Leu Gln Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln  
 85 90 95  
 Glu Lys Leu Ser Pro Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala  
 100 105 110  
 His Val Asp Ala Leu Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu  
 115 120 125  
 Arg Gln Arg Leu Ala Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly  
 130 135 140  
 Ala Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr  
 145 150 155 160  
 Leu Ser Glu Lys Ala Lys Pro Ala Leu Glu Asp Leu Arg Gln Gly Leu  
 165 170 175  
 Leu Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala Leu Glu  
 180 185 190  
 Glu Tyr Thr Lys Lys Leu Asn Thr Gln Gly Thr Leu Lys Leu Leu Asp  
 195 200 205  
 Asn Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln Leu  
 210 215 220  
 Gly Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr Glu  
 225 230 235 240  
 Gly Leu Arg Gln Glu Met Ser Pro Tyr Leu Asp Asp Phe Gln Lys Lys  
 245 250 255  
 Trp Gln Glu Glu Met Glu Leu Tyr Arg Gln Lys Val Glu Pro Leu Arg  
 260 265 270  
 Ala Glu Leu Gln Glu Gly Ala Arg Gln Lys Leu His Glu Leu Gln Glu  
 275 280 285  
 Lys Leu Ser Pro Leu Gly Glu Glu Met Arg Asp Arg Ala Arg Ala His  
 290 295 300  
 Val Asp Ala Leu Arg Thr His Leu Ala Pro Tyr Ser Asp Glu Leu Arg  
 305 310 315 320  
 Gln Arg Leu Ala Ala Arg Leu Glu Ala Leu Lys Glu Asn Gly Gly Ala  
 325 330 335  
 Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu Ser Thr Leu  
 340 345 350

